



# Engineer Assessment Teams in Disaster Relief Operations

By Captain Thomas M. Turner

**E**ngineer support to civilian authorities during disaster relief operations is one of the primary missions of U.S. Army National Guard engineers. In today's security-centered operations, it has become more apparent that efforts to "restore or recreate essential infrastructure" must be properly coordinated, supervised, and maintained by qualified officers and noncommissioned officers (NCOs) to properly represent the capabilities and professionalism of state military department assets.<sup>1</sup> As a leader assigned to an engineer assessment team (EAT), you will make initial assessments of disaster severity and help organize engineer work teams (EWTs) to execute assigned missions. EATs must make the immediate decisions on the ground that meet the intent and guidance of their command or state task force.

Depending on the requirements of EATs, they must coordinate, assess the situation, develop estimates, and report findings to higher headquarters. The initial assessments can be narrow or broad in scope, but estimates will give the requirements for assistance to local authorities. Whether used for civilian rescue in flood operations or debris cleanup after a tornado or hurricane, EATs must be readily available and on the ground as soon as possible to immediately address the needs of local agencies.<sup>2</sup>

## Civil Coordination

**C**ivil coordination is an essential task for EATs as they enter disaster areas. In most situations, EATs will already have a point of contact for the area who will

give initial civil assessments, emphasizing areas where damage is heavy or is in especially critical locations. This person will continue to be the team's primary contact unless the team is handed off to another civil authority. You could coordinate with local officials such as the mayor, county commissioners, or elected officials; local authorities such as the sheriff or city police; or local public works authorities such as the county department of public works (DPW). Each of these resources has different assets to assist you and can outsource other assets as needed. It will be important to tour the area with the point of contact and make notes on a map. Most National Guard units maintain local maps for such occasions. Designate areas of operation for both military and civilian workers so as not to crowd work areas or impede traffic. Identify local medical facilities, billeting locations, and possible contract meal sites as well. This information will come in handy when your logistics team comes in to help manage soldier care.

*Note: Be sure to properly brief your officer in charge (OIC) and NCO in charge (NCOIC) on their roles, duties, and chain of command before their arrival. They will have to brief their soldiers and prepare them for what they will be required to do and what they may be up against. For example, upon arrival at a tornado damage site, our initial duty was to assist police dogs in the recovery of civilians killed in the disaster. We also helped American Red Cross volunteers comfort home owners and family members.*

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## Civilian Resources

**U**se of local resources such as roads and dump sites is normally coordinated with the point of contact. The roads must be passable and designated for dump routes. It is usually a good idea to set warning cones along the roadside where vehicles will be turning into the site. Warnings for civilian vehicles will slow traffic around the sites and give team vehicles unrestricted access. It will also slow team vehicles and designate the turns for transitioning soldiers. The site itself should be easily accessible and allow multiple vehicles to maneuver. Limited space for turning around can cause delays and unwanted traffic around the sites. Identify one dump site for construction materials and another for vegetation, because it is usually not desirable to dump both types of debris in the same location. Discuss this with the point of contact, and discuss the use of a spreader at each site. It will be important to your assessment if you are responsible for spreading or piling the material at the dump site. The U.S. Army Corps of Engineers (USACE) Disaster Guidebook contains checklists that can help with local dump site selection and operation.<sup>3</sup> However, keep in mind that state support planning is different from federal support planning, so you probably will not have the resources that are usually available to USACE or the Federal Emergency Management Agency.

During an assessment, city, county, private, or corporate assets may be designated to assist with the cleanup. It is your responsibility to coordinate these assets and include them in the assessment. The debris area will be located along city, county, or private land. Each entity will have assets operating along with the local authorities. Also, civilian aid agencies

such as the American Red Cross may be established in the area to provide disaster assistance and comfort to victims. The local DPW or private/corporate groups will manage most of the equipment you will be interested in. Assets include civilian hydraulic excavators (HYEXs), cherry pickers, loaders, fork trucks, and trash trucks. Some county trash trucks are self-loading with clamshells, which will most likely be used for trash that civilians will gather in front of their homes or along trash pickup locations.

## Military Resources

**I**nitial military support, other than organic assets, will come from resources within the state military department. They will assist in the procurement and use of fuel, parts, supplies, and services. The state military department will usually put out a memorandum to units participating in state active duty, providing communication guidance to request assistance with purchase orders for just about anything needed for official business.

## Soldier Services

**O**ther resources will help with soldier care. You must plan for billeting, meals, medical treatment, and pay during the operation. Billeting can be established by convenience or through a contractor or charity. Convenience billeting alludes to a local military facility such as an armory. The logistics team will coordinate with a local hotel or motel to establish contract billeting if it is available. However, contract billeting will probably not be available due to the influx of emergency services in the area. Therefore, if convenience and contract billeting is not available, using local charities is



**A civilian HYEX loads debris after an April 1999 tornado at Benton, Louisiana.**



**Hurricane Lili caused widespread damage to civilian housing in October 2002.**

desirable. Local church, city, or county facilities can house soldiers in a comfortable environment. Some church facilities may also have recreation equipment/facilities and meals available for emergency service and disaster relief providers, which helps with morale and welfare. Rations can initially be coordinated through your point of contact at an established emergency services meal site, but it is better to identify a sole contractor to provide continued rations in case the emergency services move or discontinue operations.

Medical facilities must be coordinated between the state's National Guard health services department and the state military department. Though the soldiers will be on state active duty and under the state military department, the health services department probably has a designated facility in the area that it normally coordinates with. Check with them first to ensure that the facility you use for medical care has dealt with military services and accepts Workman's Compensation Insurance and the TRICARE Health Care Program. Also, contact your risk management office and get the medical point of contact so you can provide billing information to the facility.

Payroll should be coordinated weekly, ending on each Wednesday or Friday. Usually, your full-time manning adjutant or personnel services NCO will cut state active duty orders a week at a time and submit them to the state military department payroll section. These orders must be certified, faxed, or e-mailed and the originals mailed to the payroll coordinator. Your payroll section will print checks and mail them to your location in about three to four working days. Managing the payroll weekly will alleviate soldier hardship and keep better accountability of soldiers.

### **Contracting**

**C**ontracting services is extremely important to continued operations. Material and equipment identified or stationed as part of a rapid-deployment package must be maintained to ensure operational capabilities. The logistical

support team will contract items already discussed, such as billeting and rations, but it will also manage operational support items such as maintenance and special services.

Maintenance parts fall under state contracting but will be handled through normal channels. The main difference is that parts such as tires, belts, and hoses will be contracted through a local vendor that maintains the size and durability required for the equipment. Hardware items such as chainsaws must either be contracted for initial or continued use during operations or just contracted for service and repair if they are organic to the unit. A local chainsaw center or hardware store can provide the services if they accept state purchase orders.

Special services and equipment usually include nonorganic items to assist soldiers. For example, in recent operations, soldiers used face masks during tornado damage cleanup. Debris, spoiled food, and spilled chemicals caused two cases of respiratory infection, which caused unwanted downtime and follow-up care. Soldiers may also need items such as ice, gloves, safety equipment, and laundry services to maintain safety, morale, and good hygiene.

### **Engineer Disaster Assessment**

**P**roblems with coordination and reporting to higher headquarters prompted the development of the Engineer Disaster Assessment (EDA). The EDA gives EATs a reference to assist in the development of EWTs, support personnel, and special equipment. The EDA is simple and is broken into four sections: site makeup, load/haul equipment, personnel, and specialty items.

#### **Site Makeup**

During the tour with the point of contact, identify the number of disaster areas and plot them on your map. Find out which areas you will be responsible for and areas where the disaster path crosses city property. Once you have determined the number of sites, you must name and rate their

priority based on the assessment of the point of contact. If five sites are identified, simply name them Alpha to Echo and rate them 1 to 5. Some areas may contain heavier damage or may pose a future risk to civilians. Let the point of contact make this determination, then you can report the information to higher headquarters.

Sites may be divided into multiple areas based on their location and density. Grouping smaller sites will assist in the management and placement of EWTs in built-up areas. EWTs can usually manage about three to five blocks of a housing subdivision in one day. If the damage area is greater than the ability of the EWT to complete in one workday, then the site must be divided and an additional EWT must be requested. This is important for a number of reasons: First, the civilians will continue to pile debris near the street for the EWTs to pick up. Second, seeing and coordinating with a particular EWT will help the civilians properly manage debris flow and help control frustrations. Third, it will assist the OIC/NCOIC with command and control, logistical flow, and maintenance.

Site makeup also includes dump sites, entrance and exit points, and routes. These items must be identified by the point of contact and plotted on a map for reference and distribution. The construction material and vegetation dump sites will



**A front-end loader clears away debris from road.**

probably require a dozer on-site to pile debris and maintain dump points. Make sure to include this in your EDA, and plan for the possibility of moving these pieces of equipment if needed.

You will also need to establish an equipment park and maintenance area. Depending on your location, the point of contact may advise the use of a county motor pool, but it is more desirable to locate equipment near your billeting site or near the debris areas. Local schools offer the best locations for mass equipment storage and maintenance. You will find that emergency services will use these areas as well, so be sure to coordinate with your point of contact. Ask about environmental concerns and access to the area during off-peak operations, which may restrict use of the area.

### **Load/Haul Equipment**

Load/haul refers to the use of loading and hauling equipment. Both depend on the unit table of organization and equipment (TOE) and the availability of civilian assets. However, this must not be the determining factor in the EDA. When reporting, ask for exactly the number of load/haul assets needed based on your assessment. (See figure on page 34.) In some cases, you may need to use your best judgment based on the number of assets available at the time. Unit personnel can then get additional pieces of equipment from outside the unit, such as a state



**Soldiers load debris after an April 2000 tornado at Minden, Louisiana.**

## Estimating Load/Haul Assets Needed

**Example 1** - Debris is spread across three blocks in a civilian housing subdivision and the dump site is 5 miles away. One EWT is needed, with one 2 1/2-yard load asset. How many 5-ton haul assets are needed?

1. Enter the average mileage to the dump site(s): 5
2. Enter the load factor (Lf) for the single load asset available: one 2 1/2-yard loader with clamshell scoop  
(2 1/2-yard loader Lf=1, HYEX Lf=1.3)
3. Enter the haul factor (Hf) for the type of haul asset needed: 5-ton dump trucks  
(5-ton Hf=1.25, 20-ton Hf=1)

Complete the formula:

$$\frac{\text{Mileage}}{5} \times 2 \times \text{Lf} \times \text{Hf} = \frac{5 \times 2 \times 1 \times 1.25}{5} = \underline{2.5 \text{ or } 3}$$

**Example 2** - The debris is spread across five blocks of a mobile home park and the dump site is 13 miles away. Based on the density of damage and the work area, you determine that two EWTs are needed. There is one civilian HYEX and a private logging truck with a cherry picker on the back available to you. There are no city or county haul assets on the site. How many 5-ton or 20-ton haul assets are needed? Keep in mind your TOE (combat heavy) only authorizes the unit nine 20-ton dump trucks. The rest are 5-tons assigned to the line companies.

1. Enter the average mileage to the dump site(s): 13
2. Enter the load factor for the single load asset available: one civilian HYEX and one civilian cherry picker  
(2 1/2-yard loader Lf=1, HYEX/cherry picker Lf=1.3)
3. Enter the haul factor for the type of haul asset needed: 20-ton dump trucks and 5-ton dump trucks  
(5-ton Hf=1.25, 20-ton Hf=1)

Complete the formula for each asset:

HYEX with 20-ton dump trucks

$$\frac{\text{Mileage}}{5} \times 2 \times \text{Lf} \times \text{Hf} = \frac{13 \times 2 \times 1.3 \times 1}{5} = \underline{6.76 \text{ or } 7}$$

*Note: Know your assets, and never assume that all of them are or will remain mission capable (MC). Assume that five are not mission capable (NMC), and replace the 20-ton dump trucks with 5-ton dump trucks using a factor of 1.25. Example: Only four are MC and seven are needed. You can simply take the remainder and multiply it by the applicable Hf;  $3 \times 1.25 = 3.75$  or 4. You will require four 20-ton dump trucks and four 5-ton dump trucks for a dump site 13 miles away.*

Civilian cherry picker with 5-ton dump trucks

$$\frac{\text{Mileage}}{5} \times 2 \times \text{Lf} \times \text{Hf} = \frac{13 \times 2 \times 1.3 \times 1.25}{5} = \underline{8.45 \text{ or } 9}$$

All assets must be tracked to account for the number of loads hauled and to estimate the amount of debris removed. Units can use a notepad, spreadsheet, or load ticket for load accounting. USACE has load accounting data elements as well as an example of a load ticket in its *Disaster Guidebook*.<sup>4</sup> Load tracking will help OICs and NCOICs ensure consistent work effort and enable them to establish process improvements during the operation.

mobilization and training equipment site or another unit, if it is needed. Also, load assets should be matched to the appropriate haul assets. If 5-ton dump trucks are requested, then ask for 2 1/2-yard loaders for them. Never ask for 5-yard loaders unless you intend to move dirt. The 5-yard loader does not have a clamshell scoop, which greatly enhances lift ability when dealing with debris. Match 20-ton dump trucks with military HYEXs or civilian assets such as cherry pickers. These larger load assets have higher lifting ability to get into the 20-ton dump bed. Without a ramp, 2 1/2-yard loaders do not have the necessary reach.

Haul assets can be a mixture of military and civilian equipment. To limit liability, it is best if military personnel load military equipment and civilians load civilian equipment, but do not assume that this will be the case. Haul capacity will vary based on the type of debris and the experience and training of the loader. The key is to ensure that no debris hangs out of

the dump bed, where it could damage property or injure someone nearby.

### Personnel

Soldiers selected for duty must have certain qualifications. Foremost, they must be qualified on the equipment being used. It is always a good idea to include disaster relief equipment as part of the unitwide driver's training program so that everyone is qualified on at least a high-mobility, multipurpose wheeled vehicle (HMMWV), 2 1/2-ton cargo truck, and 5-ton dump truck. Military occupational specialty (MOS)-specific operators, such as heavy construction equipment and general construction equipment operators, should be identified to operate equipment such as HYEXs, loaders, 20-ton dump trucks, and small emplacement excavators.

Soldiers must be available for duty for a minimum of one week, usually Saturday through Friday. They must bring all



items needed to sustain them during the week, such as a sleeping bag, uniforms, and civilian clothes. In addition, soldiers should bring personal entertainment items to keep them occupied after duty hours.

Estimates of the number of personnel needed are based on your equipment and guidance from higher headquarters. Initially, calculate the number of drivers and assistant drivers needed by multiplying the number of haul assets by two. Then estimate two operators per load asset. One soldier will operate the equipment while the other serves as a spotter. Factor in soldiers needed to operate specialty equipment such as chainsaws and add an OIC, an NCOIC, a driver, and a two-person logistical team to transport meals and other items. Add all these together, include MOS-specific information, and contact higher headquarters for maintenance support. Usually, the maintenance warrant officer or motor sergeant will tell you what they will do to support the operation. Do not include the logistical support team or any other group outside of the EWT control. Lastly, do not forget to assign a medic or qualified combat lifesaver to each EWT, and ensure that they inventory their aid bags before operations.

### Specialty Items

Specialty items include generators, chainsaws, pioneer trailers, tools, or any other specialty sets, kits, and outfits. They also include all the things needed to maintain and service the items mentioned. In areas where most debris is vegetation, chainsaws are the best asset. If chainsaws are included in your TOE, bring all of them and have those that are NMC serviced on the state contract. An added necessity for each haul asset is a set of branch shears to cut any loose vegetation hanging outside of the dump bed. The logistical team assigned to each site should maintain gas, water, two-cycle oil, bar oil, and any other needed petroleum, oil, and lubricants. Everything else will be coordinated through your logistical support team and either brought from the unit or purchased for your use.

### Conclusion

Unlike engineer construction projects, there is little reporting, no completion certificate to get signed, and no clearly defined completion date. You will find that civilians will continue to place debris by the roadside long after the military operation is completed. The duty of the EATs and EWTs is to provide relief to local authorities and civilian workers until they can handle the problem on their own, using the equipment they have. Coordinate often with points of contact and higher headquarters to keep soldiers informed of



**Soldiers use a cherry picker to load a dump truck.**

current operations, and take the time to properly plan the EWT effort so they can successfully assist in disaster relief.

### Endnotes

<sup>1</sup> Field Manual (FM) 3-0, *Operations*, Washington, D.C., 14 June 2001, page 10-5.

<sup>2</sup> CALL Newsletter 93-6, *Operations Other Than War*, Volume II - Disaster Assistance, Fort Leavenworth, Kansas, October 1993, Chapter 9.

<sup>3</sup> U.S. Army Corps of Engineers *Disaster Guidebook*, Galveston District, Galveston, Texas, 1 April 1999. Appendix D. <<http://www.swg.usace.army.mil/em/mg/mguide.asp>>.

<sup>4</sup> Ibid., Appendix H.

### References

Louisiana National Guard *Emergency Procedures Operations Plan for Natural Disasters*, Jackson Barracks, New Orleans, Louisiana, 10 March 1993.

Army Regulation 500-60, *Disaster Relief*, 1 August 1981.

FM 5-34, *Engineer Field Data*, Washington, D.C., 30 August 1999.

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*Captain Turner has served in the Louisiana Army National Guard for more than 16 years. He currently is in the Active Guard/Reserve as the plans officer and administrative officer of the 528th Engineer Battalion (Combat)(Heavy) in Monroe, Louisiana. He has participated in three tornado damage relief operations and one ice storm.*

# Disaster Relief After Hurricane Lili

By Captain Thomas M. Turner

In October 2002, Hurricane Lili made its way through Louisiana, prompting National Guard involvement in disaster preparation and relief. The 225th Engineer Group, which includes four combat heavy engineer battalions—the 205th, 527th, 528th, and 769th—and the state's other major commands supported the operation. The operation was divided into five phases: Phase I, alert and preparation at home station; Phase II, movement to forward staging areas; Phase III, employment into the area of operations; Phase IV, deploy back to home station; and Phase V, recovery and deactivation. Our battalion, the 528th, was assigned to an area in Opelousas, in south-central Louisiana.

The 225th Engineer Group task-organized each engineer battalion into two to three EATs and five EWTs, centrally controlled by the group but supported by their parent units. Later, the EATs were recalled, and the EWTs fell under the control of the established state task force. The EATs were made up of two soldiers—one officer and one NCO. Each EWT totaled 23 soldiers (including a medic) and had the following equipment: two HMMWVs, a HMMWV maintenance truck, five 5-ton dump trucks, two 2 1/2-yard loaders, an M920 with trailer, and a small emplacement excavator (SEE). EWTs were task-organized by the state task force, and the teams were broken up and deployed to separate sites to accommodate multiple needs. This method worked well for the larger sites but created difficulties for smaller teams that did not have the proper equipment for some tasks. In the case of the smaller teams, the SEE trucks were not utilized to their full potential because of their limited load capacity and lift height. The larger teams usually arrived on-site with two 2 1/2-yard loaders and four 5-ton dump trucks, which were very effective for debris removal. As this experience showed, it is always a good idea to train teams to handle different types of tasks and keep them together throughout operations. If you must develop a table of distribution and allowances (TDA) for EWTs, then create more than one TDA to handle large and small tasks using compatible loading and hauling assets.

Our EWT was lucky in that it replaced a unit that was moving to another site. All of the necessary contracts had already been established and functioned well with only minor coordination needed. Billeting was organized at the National Guard Armory in Opelousas, which was well suited to handle the number of soldiers and the EWT's administrative needs.

Chainsaws became a problem due to serviceability and the number requested (24) versus the 19 organic to our unit.<sup>1</sup> Usually, we set up a contract with a local hardware store or chainsaw retailer to provide service and support at larger

disaster relief sites. However, smaller sites did not have this support and EWTs quickly ran into problems obtaining chains and bar oil. Most of the 5-ton dump trucks were drawn from mobilization and training equipment sites, which assisted in equipment recovery and distribution. We also provided our own fuel support with two heavy expanded-mobility tactical truck (HEMTT) fuelers.

Most of the power was out in the southern part of the state and cellular telephone usage was difficult because of downed towers. However, we used state-issued 800-megahertz radios and commercial telephones when they were available. Most EWTs used small hand-held radios for close communication between leaders and equipment operators.

We had to address issues of soldier care, including water and meals. We had not sent water buffalos ahead to the area of operations since we had been told that logistical support would come from another battalion that would be collocated with us. A problem was quickly identified when the other unit moved south, but we were able to support our soldiers with organic assets soon afterward. The lesson learned in this situation was to not depend on another unit to support our soldiers' needs unless the unit will exercise total operational control over them for the duration of the emergency. The contract meals issue was resolved quickly by coordinating with the vendor to lower the number of meals provided to the site and coordinating with the state purchasing and contracting office to change the supported unit.

Overall, the relief operations went well, with normal problems that were quickly resolved. Our battalion, and others, received kind words from the communities that we supported. We also took the time to recognize our soldiers, who had done extraordinary work in support of the Hurricane Lili Task Force.

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The Hurricane Lili Task Force after-action review is available in Joint Universal Lessons Learned System (JULLS) format through the Louisiana Office of Homeland Security and Emergency Preparedness, 7667 Independence Boulevard, Baton Rouge, Louisiana 70806, <<http://www.loe.state.la.us>>, or Office of the Adjutant General, ATTN: JFHQS (J3), Bldg. #35, Jackson Barracks, New Orleans, Louisiana 70146-0330.

## Endnote

<sup>1</sup> CALL Newsletter 93-6, *Operations Other Than War*, Volume II – Disaster Assistance, Fort Leavenworth, Kansas, October 1993, Chapter 6.